

**WHAT IS CLAIMED IS:**

1. A hydrogen generator for a fuel cell comprising:
  - a reforming pipe comprising;
    - an erect inner pipe;
    - 5 an outer pipe surrounding said erect inner pipe of which cross section is polygonal or wavelike; and
    - a catalyst layer formed between the erect inner pipe and the outer pipe, with said catalytic layer being filled with a reforming catalyst to make a fuel containing an organic compound having hydrogen atoms react with water
    - 10 to reform into a hydrogen-rich gas;
  - an outermost pipe surrounding and inscribed by the outer pipe in each vertexes of the contour thereof; and
  - a passage of the reformed gas formed between the outer pipe and the outermost pipe.
- 15 2. The hydrogen generator for the fuel cell according to claim 1, further comprising:
  - a fuel supplying part for supplying the fuel to the reforming pipe;
  - a water supplying part for supplying the water to the reforming pipe;
  - 20 a heating means for supplying a heat quantity necessary for a reforming reaction by burning a combustion fuel in a combustion pipe set inside of the erect inner pipe of the reforming pipe;
  - a heat insulating means for insulating the heat released from the reforming pipe at the outer periphery of the outermost pipe;
  - 25 a CO transformer for making carbon monoxide contained in a reformed gas flowing out from the reforming pipe react with water and thereby to

- transform carbon monoxide and water into carbon dioxide;
- a CO eliminator having an selective oxidation catalyst for making carbon monoxide contained in a transformed gas flowing out from the CO transformer react with air or oxygen to generate carbon dioxide; and
- 5       a vessel for housing the above components,  
wherein the combustion pipe, the reforming pipe, the outermost pipe, the heat insulating means, the CO transformer, a first spatial portion, the CO eliminator, a second spatial portion, and the vessel are arranged in a concentrical circular way in order from the inside.
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3. The hydrogen generator for the fuel cell according to claim 2, wherein the heat insulating means is a heat insulting material, and a quality and a thickness of the heat insulating material are selected so as to be able to control the surface temperature of the heat insulating material at 200 to 300°C.
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4. The hydrogen generator for the fuel cell according to claim 2 or 3, wherein the heat insulating means is a mirror-surface heat insulating member and a quality, a thickness, and a surface finish state of the mirror-surface heat insulating member are selected so as to be able to control the inside  
20       temperature of the CO transformer at 200 to 300°C.
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5. The hydrogen generator for the fuel cell according to claim 2, wherein the heat insulating means is a vacuum space, and a thickness and a vacuum degree of the vacuum space are selected so as to be able to control the inside  
temperature of the CO transformer at 200 to 300°C.

6. The hydrogen generator for the fuel cell according to any one of claims 2 to 5, wherein a heat transfer accelerating material or a heat storing material is set to the outlet of the reformer.

5        7. The hydrogen generator for the fuel cell according to any one of claims 2 to 6, wherein the external wall of the vessel is sloped in the range from the inlet up to the outlet of the transformed gas of the CO eliminator to change the quantity of the selective oxidation catalyst across the diameter from the inlet up to the outlet of the transformed gas.

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8. The hydrogen generator for the fuel cell according to any one of claims 2 to 7, wherein a blower is set in the vessel and air is supplied to the first spatial portion and the second spatial portion to control the temperature.

15        9. The hydrogen generator for the fuel cell according to any one of claims 2 to 8, wherein a blower is set in the vessel to control the temperature of the selective oxidation catalyst layer at the transformed-gas inlet side of the CO eliminator to 100 to 200°C.